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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,204	06/09/2005	Mi-Suen Lee	US020523	1787

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EXAMINER

LAROSE, COLIN M

ART UNIT	PAPER NUMBER
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2624

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/538,204	Applicant(s) LEE ET AL.	
	Examiner COLIN M. LAROSE	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 9 April 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Amendments and Remarks

1. Applicant's amendments and remarks dated 9 April 2008, have been entered and made of record.

Response to Amendments and Remarks

2. Applicant's amendments to claims 1, 9, and 17 are sufficient to overcome the previous § 102 rejections. Accordingly, those rejections have been withdrawn. However, in view of newly-discovered prior art, new grounds of rejection appear below.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,806,898 by Toyama et al. ("Toyama") in view of U.S. Patent 6,707,933 by Mariani et al. ("Mariani").

Regarding claim 1, Toyama discloses a method (figure 8) for processing an image containing at least a portion of a head of a human in a video phone system, comprising:

estimating an orientation of said head in said image using a pattern recognition technique (810);

computing a three dimensional model of a face surface of said human using a computer vision technique (822, 824); and

adjusting an orientation of said three dimensional face surface model to provide a frontal view (826).

Toyama does not appear to disclose that the image is kept unmodified when the orientation of the head is estimated to be frontal, as claimed. It appears that Toyama performs the computing and adjusting steps regardless of the orientation of the head.

Mariani discloses a facial direction estimation system. In particular, for a video conferencing environment, Mariani teaches that "[u]sing the face direction estimation ... it is possible to enhance the quality of the transmitted images by generating a frontal view when the face is off-frontal ... or by unchanging the current satisfying frontal face which is displayed" (column 3/34-40). Thus, Mariani, like Toyama, recognizes the need to adjust the orientation of the face in order to achieve eye-to-eye contact for video conferencing communications. Mariani further recognizes that when the original image of the face is a "satisfying frontal face" there is no need to change the orientation of the head, and the image can be left unchanged. Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Toyama by Mariani to achieve the claimed invention since Mariani teaches that when the orientation of the head is estimated to be front-facing, there is no need to modify the image of the face since it is already in the desired orientation.

Regarding claim 2, Toyama discloses said computing step further comprises the step of using a symmetric face assumption to obtain a complete three dimensional face surface model for a profile view (824).

Regarding claim 3, Toyama discloses said computing step further comprises the step of employing a structure from motion technique to obtain said three dimensional face surface model (column 13/1-10).

Regarding claim 4, Toyama discloses said estimating step applies a classification technique (i.e. determining the orientation of the head necessarily involves a technique that classifies, i.e., ascertains, the pose of the head using any known method—column 6/53-67).

Regarding claim 5, Toyama discloses said computing step generates a morphable three dimensional model (column 10/60—11/43: the 3D model of the face can be morphed, i.e., rotated, moved, changed, etc., into a desired shape/pose).

Regarding claim 6, Toyama discloses the step of mapping said three dimensional face surface model having an adjusted orientation to a two dimensional space (828).

Regarding claim 7, Toyama discloses the step of transmitting said adjusted image to a remote user (see e.g. figure 2).

Regarding claim 8, Toyama discloses the step of presenting said adjusted image to a local user (see e.g. figures 1 and 2).

Regarding claim 9, Toyama discloses an image processor (102, figure 1) for use in a video phone system, comprising:

a memory (104) for storing an image containing at least a portion of a head of a human;
and

a head pose corrector that

(i) estimates an orientation of said head in said image using a pattern recognition technique (810, figure 8);

(iii) computes a three dimensional model of a face surface of said human using a computer vision technique (822, 824, figure 8); and

(iv) adjusts an orientation of said three dimensional face surface model to provide a frontal view (826, figure 8).

Toyama does not appear to disclose that the image is kept unmodified when the orientation of the head is estimated to be frontal, as claimed. It appears that Toyama performs the computing and adjusting steps regardless of the orientation of the head.

Mariani discloses a facial direction estimation system. In particular, for a video conferencing environment, Mariani teaches that "[u]sing the face direction estimation ... it is possible to enhance the quality of the transmitted images by generating a frontal view when the face is off-frontal ... or by unchanging the current satisfying frontal face which is displayed" (column 3/34-40). Thus, Mariani, like Toyama, recognizes the need to adjust the orientation of the face in order to achieve eye-to-eye contact for video conferencing communications. Mariani further recognizes that when the original image of the face is a "satisfying frontal face" there is no need to change the orientation of the head, and the image can be left unchanged. Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Toyama by Mariani to achieve the claimed invention since Mariani teaches that when the

orientation of the head is estimated to be front-facing, there is no need to modify the image of the face since it is already in the desired orientation.

Regarding claim 10, Toyama discloses said head pose corrector is further configured to use a symmetric face assumption to obtain a complete three dimensional face surface model for a profile view (824, figure 8).

Regarding claim 11, Toyama discloses said head pose corrector is further configured to employ a structure from motion technique to obtain said three dimensional face surface model (column 13/1-10).

Regarding claim 12, Toyama discloses said head pose corrector is further configured to apply a classification technique to obtain said head orientation (i.e. determining the orientation of the head necessarily involves a technique that classifies, i.e., ascertains, the pose of the head using any known method—column 6/53-67).

Regarding claim 13, Toyama discloses said three dimensional face surface model is a morphable three dimensional model (column 10/60—11/43: the 3D model of the face can be morphed, i.e., rotated, moved, changed, etc., into a desired shape/pose).

Regarding claim 14, Toyama discloses said head pose corrector is further configured to map said three dimensional face surface model having an adjusted orientation to a two dimensional modified image (828, figure 8).

Regarding claim 15, Toyama discloses said two dimensional modified image is transmitted to a remote user (see e.g. figure 2).

Regarding claim 16, Toyama discloses said two dimensional modified image is presented to a local user (see e.g. figures 1 and 2).

Regarding claim 17, Toyama discloses a video phone system (figures 1-2), comprising:
a memory (104, figure 1) for storing an image containing at least a portion of a head of a human; and

a head pose corrector (102, figure 1) that

(i) estimates an orientation of said head in said image using a pattern recognition technique (810, figure 8);

(iii) computes a three dimensional model of a face surface of said human using a computer vision technique (822, 824, figure 8); and

(iv) adjusts an orientation of said three dimensional face surface model to provide a frontal view (826, figure 8).

Toyama does not appear to disclose that the image is kept unmodified when the orientation of the head is estimated to be frontal, as claimed. It appears that Toyama performs the computing and adjusting steps regardless of the orientation of the head.

Mariani discloses a facial direction estimation system. In particular, for a video conferencing environment, Mariani teaches that "[u]sing the face direction estimation ... it is possible to enhance the quality of the transmitted images by generating a frontal view when the face is off-frontal ... or by unchanging the current satisfying frontal face which is displayed" (column 3/34-40). Thus, Mariani, like Toyama, recognizes the need to adjust the orientation of the face in order to achieve eye-to-eye contact for video conferencing communications. Mariani

further recognizes that when the original image of the face is a "satisfying frontal face" there is no need to change the orientation of the head, and the image can be left unchanged. Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Toyama by Mariani to achieve the claimed invention since Mariani teaches that when the orientation of the head is estimated to be front-facing, there is no need to modify the image of the face since it is already in the desired orientation.

Regarding claim 18, Toyama discloses said head pose corrector is further configured to use a symmetric face assumption to obtain a complete three dimensional face surface model for a profile view (824, figure 8).

Regarding claim 19, Toyama discloses said head pose corrector is further configured to employ a structure from motion technique to obtain said three dimensional face surface model (column 13/1-10).

Regarding claim 20, Toyama discloses said head pose corrector is further configured to apply a classification technique to obtain said head orientation (i.e. determining the orientation of the head necessarily involves a technique that classifies, i.e., ascertains, the pose of the head using any known method—column 6/53-67).

Regarding claim 21, Toyama discloses said head pose corrector is further configured to map said three dimensional face surface model having an adjusted orientation to a two dimensional modified image (828, figure 8).

Regarding claim 22, Toyama discloses said two dimensional modified image is transmitted to a remote user (see e.g. figure 2).

Regarding claim 23, Toyama discloses said two dimensional modified image is presented to a local user (see e.g. figures 1 and 2).

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Colin M. LaRose whose telephone number is (571) 272-7423. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Werner, can be reached on (571) 272-7401. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

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applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000. Any inquiry of a general nature or relating to the status of this application or proceeding can also be directed to the TC 2600 Customer Service Office whose telephone number is (571) 272-2600.

/Colin M. LaRose/
Colin M. LaRose
Primary Examiner
Group Art Unit 2624
26 June 2008